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The Iron and Steel Board

The average ironfoundry executive probably regards the Iron and Steel Board as a body primarily created to carry through the reorganisation of the iron and steel industry, and it incidentally looks after the supply of raw materials. From the Governmental angle, but not from ours, the ironfoundry industry is regarded as part of the iron and steel industry. From the wages angle, however, this is largely, though not entirely, a matter for the quite separate engineering industries. This imposes upon its leaders the need to exercise much perspicacity to keep these two powerful bodies *au courant* with essential requirements and development schemes within the ironfounding industry. The long-established machinery is helpful in the case of wages negotiations, but the " Board " is quite new, and ironfounding so complex, that much has to be done before a complete picture can be painted. This Board has, through the Ministry of Supply, exactly the same powers as existed during the war. The duties of the Board were set out officially by the Ministry of Supply in the following terms:—

(*a*) To review and supervise programmes of development needed for the modernisation of the iron and steel industry and to watch over the execution of approved schemes in such programmes.

(*b*) To supervise as necessary the industry in current matters, including the provision of its raw material requirements, and the administration, under powers delegated by the Minister, of such continued direct control as may be required over the production, distribution and import of iron and steel products.

(*c*) To advise on general price policy for the industry and on the fixing of prices for controlled products.

This direct statement, be it noted, carries no exceptions, and our interpretation of its import includes powers to requisition or to close down. To our mind, it should be the policy of every foundry concern to co-operate to the utmost of their ability with the Board, for we are convinced that by so doing there will be a clear revelation of the complexity of the industry, and disclose that for the general good of industry its elasticity must be preserved. This can only be done through the close co-operation of the smaller concerns. If when asked to fill up forms which are to their minds ridiculously complicated, then we suggest they take the following steps. Fill up the forms to the best of their ability and attach a letter showing just where their output goes. Quite often they have the unofficial responsibility of keeping quite important local factories free from serious breakdowns. This sort of information, when assembled, is quite as valuable as a mass of figures to those negotiating on behalf of this industry. Secondary, or tertiary, industries or trades are well recognised by governments as being of equal importance to the general welfare of nations as the large mass-producing concerns. We were impressed when listening to " In Town To-night," and heard " the man in the street " being asked what he would do if he suddenly inherited a fortune. Without exception, all expressed a desire to create a business for themselves. Thus the small foundry owners should unite by joining their district, or other employers', association, in order to keep the special services which they give well to the forefront in negotiations with the Board. The fact that they have either created or taken over a small business indicates that they realise the profound importance of giving personal service to their customers. Larger concerns have to develop special departments to emulate this to the best of their abilities, but its need obviously disappears when an industry be-

(*Continued overleaf, foot of column* 2.)

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FORTHCOMING EVENTS

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

JANUARY 17.

Chemical Engineering Group :—"Flame Spraying of Metals and Plastics by the Powder Process," by F. A. Rivett. At the Geological Society, Burlington House, Piccadilly, London, W.1, at 5.30 p.m.

Institute of Physics (Industrial Radiology group) :—"Sonic Methods in Non-destructive Testing," by R. Meakin. At E.L.M.A., 2, Savoy Hill, London, W.C.2, at 6.30 p.m.

JANUARY 20.

Sheffield Society of Engineers and Metallurgists :—"Recent Developments in the Aluminium Industry," by Dr. C. J. Smithells. At the Royal Victoria Station Hotel, Sheffield, at 6.15 p.m.

JANUARY 22.

Association of Bronze and Brass Founders (London and Home Counties area) :—Informal meeting. At the Hotel Russell, London, W.C.1, at 1 p.m.

JANUARY 24.

Institution of Mechanical Engineers :—"Materials New to Engineering," by F. T. Barwell and J. C. W. Humphrey. At the Institution, Storey's Gate, London, S.W.1, at 5.30 p.m.

Manchester Association of Engineers :—Industrial Films. At the Midland Hotel, Manchester, at 5.45 p.m.

Institute of British Foundrymen

JANUARY 18.

Bristol and West of England branch :—"Bronze Castings," by J. L. Howard. At the Grand Hotel, Broad Street, Bristol, at 3.30 p.m.

JANUARY 25.

London branch :—"Broad Aspects of Pattern-making, with Especial Reference to a New Machine Development," by B. Levy. At the Waldorf Hotel, London, W.C.2, at 7.30 p.m.

FOUNDRY INDUSTRY QUESTIONNAIRE

Every ironfounder throughout the country should by now be in possession of a questionnaire sent out by the Council of Ironfoundry Associations on behalf of the Iron and Steel Board. Generally speaking the questions are straightforward, except the last group (No. 6), which asks: "After carrying out the work under 4 (*a*), (*b*) and (*c*) [development modernisation; capital renewals which do not represent any major change in production methods or capacity and provision of amenities] to what extent (expressed as a percentage) will working conditions and amenities be in line with the most up-to-date practice?" For the smaller concerns, a covering letter giving details of local conditions would probably "fill the bill." Even the larger firms will have difficulty in assessing just what is the "most up-to-date practice." Take lighting as a case in point. We advised a foundry owner in one large town to instal lamps capable of giving an overall lighting of 12 to 15 ft. candles, but the local electrical contractors were quite ignorant as to what this meant!

As this questionnaire is being put out on behalf of the Government it must be filled in and returned to the Iron and Steel Board.

INSTITUTION OF MECHANICAL ENGINEERS

CENTENARY CELEBRATIONS

The Institution of Mechanical Engineers reaches the centenary of its foundation this year. The council are planning to celebrate this important event during the week commencing June 8. On Sunday afternoon a thanksgiving service will be held at Westminster Abbey, and on Monday afternoon the conference will be formally opened at the Central Hall, Westminster, by the Lord President of the Council.

During the remainder of the week the mornings will be occupied by technical meetings dealing with 12 main branches of mechanical engineering activities. During this series of meetings some 36 short lectures will be given by engineers distinguished in each field, collaborating in many cases with a number of co-authors. During the afternoons visits will be arranged to places of engineering interest in or within reasonable access of London, and it is possible that some special visits may be arranged for ladies who accompany members.

On the Monday evening the president's reception will take place at the Science Museum, South Kensington, where a special exhibition will be arranged illustrative of progress in mechanical engineering during the century. A special exhibition associated with George Stephenson will be held in the Institution Building.

During the week a reception will be given by H.M. Government and two special evening lectures will be delivered. The Wednesday evening is reserved for a purely social function at a West End restaurant. On Friday evening, to conclude the celebrations, a banquet to the delegates will take place at the Guildhall, at which the Lord Mayor and the Prime Minister will be among the principal guests.

MOTOR INDUSTRY RESEARCH ASSOCIATION

The first annual report of the Motor Industry Research Association shows continuing interest in cast products. The Association is devoting much effort to collecting data on cast-iron crankshafts in order that better designs may be forthcoming. There will be need to co-operate with the foundry industry as the final solution will be marriage between the best "engineering" design and the best foundry design. The foundry product undergoing examination for improved design is the piston ring.

The Iron and Steel Board

(Continued from page 51.)

comes a State monopoly. Thus London, with the highest population of any city in the world has fewer telephones than either New York or Chicago, both of which are served by private enterprise. The enterprise shown by the smaller concerns will, if properly placed, before the Board, be appreciated, and they will be helped to maintain their independence, but the facts must be known and analysed to stress their vital importance. Again, we ask them to help by co-operative action.

MALLEABLE CAST IRON*

By H. G. HALL, F.I.M.†

Lack of Progress

After some 200 years of development and research, are those in the malleable industry satisfied? They ought not to be! Compare the progress of the industry with that of its younger competitors—aluminium, magnesium, zinc die castings, plastics—and the answer is obvious. Far too many foundries are still operating under the same conditions as they were in our grandfathers' time, with little or no technical control, and on the whole with obsolete plant.

How then, have we managed to compete with modern industries? There is a recent statement made in the American technical Press[1]: "It was realised early during the war that the properties of malleable cast iron, its tensile strength, shock resistance, corrosion resistance and machining qualities, together with its abilities to be cast to close final dimensions, were sufficiently impressive to accept it as a worthy replacement for steel, brass and even aluminium in many cast parts." In short, the material is good, even if the production technique is out of date.

What are the fundamental reasons for this lack of progress:—First, until the beginning of the war, few malleable ironfounders in this country were willing to pool their ideas and technical achievements, and secondly, in spite of the fact that the majority of malleable ironfoundries are small concerns, few of them in the past have really supported any research organisation. By support, money alone is not sufficient; vision, enthusiasm, the free discussion of problems and ambitions are vital, and without these no research organisation can fulfil its obligations, and no industry can flourish. It is of good augury that many malleable ironfounders have joined the British Cast Iron Research Association during the last five years, and that there is between them a growing spirit of co-operation and enthusiasm.

Perhaps the third reason at the root of this lack of progress can be traced to the lengthy annealing cycles. These are so long that they tend to iron out temperature differences, thermal lag, composition variations, and above all subtle differences of annealability.

The use of large, batch type ovens, composed of masses of refractories, iron containers, tons of packing material laboriously filled and emptied, has prevented the industry for far too long from applying scientific principles, and obtaining technical data, which would enable it to use modern methods of production, and rapid methods of annealing. It is proposed to attempt to gauge, therefore, in this Paper, the extent of the knowledge and the necessity for further research and development.

The industry is generally divided into two watertight compartments, whiteheart and blackheart. This is the orthodox point of view, of doubtful validity. What is the fundamental difference between these two types? The answer is the type of graphite formation, shown in Figs. 1 and 2, from which it will be observed that the graphite nodules are of an entirely different character, the whiteheart nodules being completely spheroidal,[2] compact, and of small surface area, whereas the blackheart nodules consist of a flake graphite aggregate of large surface area. This distinct difference has been attributed to the two types of annealing used in whiteheart and blackheart production, but Figs. 7 to 10 will disprove this. These

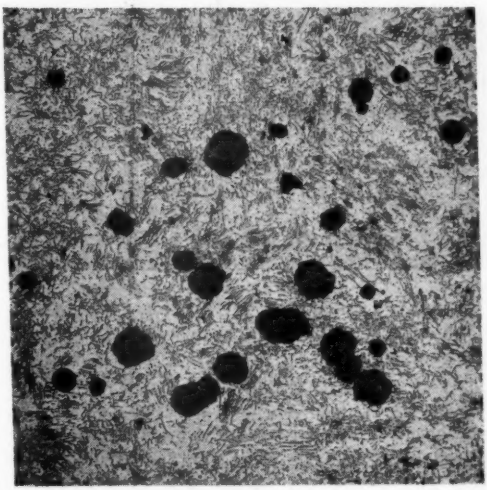

FIG. 1.—WHITEHEART CENTRE (× 50).

samples were annealed side by side in the same can, were packed in hematite ore, and given an anneal of the whiteheart type.

The only difference between the samples was in the manganese and sulphur contents, the spheroidal nodules occurring in the samples in which there was insufficient manganese present to form manganese sulphide. The flake graphite aggregate occurred in the samples containing sufficient manganese to balance the sulphur and form manganese sulphide.

Fig. 11 shows the total carbon content from surface to centre of these two compositions. It should be noted that considerable elimination of carbon—due to annealing at relatively high temperatures in hematite ore—has taken place in both compositions,

* A Paper presented to the Birmingham, Coventry and West Midlands branch of the Institute of British Foundrymen.

† Director, Castings, Limited, Walsall.

although the shape of the curves differ markedly. Whiteheart and blackheart do not, therefore, constitute two distinct and water-tight compartments.

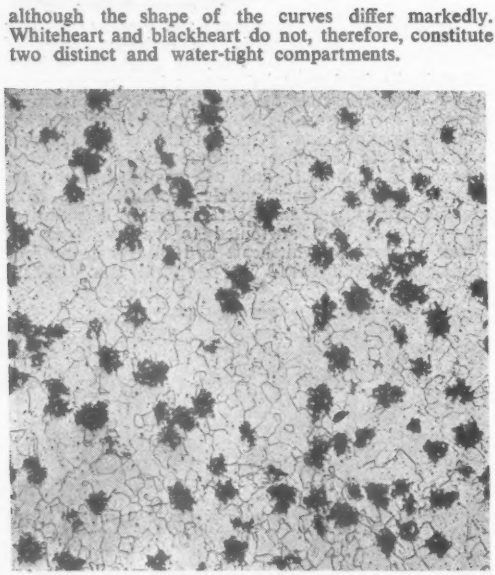

FIG. 2.—BLACKHEART CENTRE (× 60).

Two phenomena occur when making malleable from white cast iron:—(1) Graphitisation, the outstanding factor in the production of orthodox blackheart, and (2) decarburisation, the basis of the production of orthodox whiteheart. In practice these phenomena nearly always take place coincidentally, in the malleablisation of iron. Confirmation can be obtained from the American Cast Metals Handbook, 1944 edition,[3] which states that the carbon content of the annealed blackheart casting is definitely lower than that of the original white iron.

Graphitisation

White cast iron consists, at room temperature, of pearlite and cementite, and the changes taking place during graphitisation are as follow:—When white cast iron is heated above the A.1 critical point the pearlite changes to austenite, which is capable of dissolving increasing amounts of cementite, at increasing temperatures, until for a definite temperature and time, a saturation limit is reached, and the structure will consist of saturated austenite and free cementite. Therefore, assuming that a temperature of 900 deg. C. has been chosen as a maximum annealing temperature, and that this temperature has been reached, the structure will consist of austenite and cementite, and as the temperature is maintained, cementite will be dissolving in the austenite.

While this is going on, however, and before equilibrium (that is the saturation limit of cementite in austenite at 900 deg. C.) is reached, the less soluble or free graphite is being precipitated from the austenite. As annealing continues more carbon is precipitated from the austenite as free graphite, the nodules of which rapidly increase in size. During the precipitation the austenite absorbs free cementite to maintain its saturation, which is continually tending to be lowered by the precipitation of carbon.

This continual precipitation of graphite and corresponding absorption of cementite, continues until there is no free cementite left. Equilibrium for the temperature chosen, in this case 900 deg. C., has been attained and the metal consists entirely of saturated austenite and free graphite carbon. In theory, there is no advantage in holding at this temperature after equilibrium is reached, and since austenite cannot hold so much carbon in solution at lower temperatures, it will be necessary to lower the temperature below 900 deg. C. in order to precipitate more graphite. At the

FIG. 3.—SPHEROIDAL NODULE-WHITEHEART. IRON SULPHIDE NUCLEI (× 1,000).

critical range around 720 deg. C. austenite can hold in solution only about 0.6 per cent. carbon, the equivalent of about 9 per cent. cementite, whereas just short of the melting point austenite can dissolve 25.5 per cent. cementite. Therefore, the metal is allowed to cool slowly to the A.1 critical point, about 720 deg. C., carbon being progressively precipitated on to the existing nodules, and the austenite becoming lower and lower in carbon content.

At and just below 720 deg. C., roughly 0.6 per cent. carbon remains in solution in the austenite, the remainder of the carbon being present as graphite. If the temperature is dropped too rapidly at this stage, the 0.6 per cent. carbon is retained in the metal as pearlite.

FIG. 5.—FLAKE GRAPHITE AGGREGATE—FORMING AROUND MANGANESE SULPHIDE NUCLEI (× 1,500).

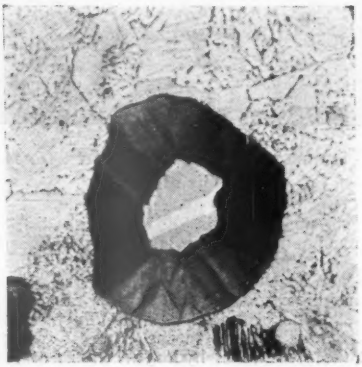

FIG. 6.—SPHEROIDAL NODULE AROUND DUPLEX INCLUSION. FE-S, MN-S (× 1,200).

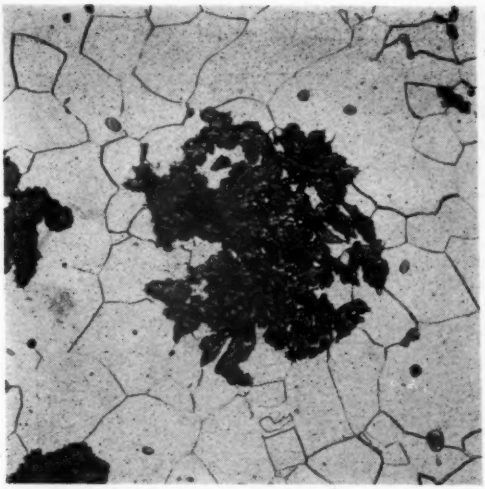

FIG. 4.—FLAKE GRAPHITE AGGREGATE—BLACKHEART (× 300).

In practice, therefore, cooling through the critical range should be slow, so as to ensure complete graphitisation.

Substantially, the stages of the process can be summed up as follows:—(1) Heating to a predetermined maximum temperature; (2) holding at this temperature until all free cementite has been dissolved, and the structure consists of saturated austenite and free graphite; (3) cooling to just above the critical point; (4) cooling sufficiently slowly through the critical range to deposit on to the existing nodules the whole of the remaining combined carbon, and (5) cooling to room temperature. This summary, while fundamentally correct, leaves out of account probably the most important factor, namely, the number of nodules formed per unit area. Obviously carbon will deposit more rapidly, the more numerous the centres of crystallisation or nuclei. There is some evidence that (contrary to the belief generally held) the rate of heating to the predetermined temperature influences the number of nodules and that once the chosen annealing temperature is reached, changes in the number of nodules become rare.

The number of nodules which form is a complex matter, not yet thoroughly understood.[4] It is fully deserving of further research, since better understanding of the phenomenon will be the key to rapid annealing.

Matters are immensely complicated by the fact that white cast iron made from pig-iron A may be capable of being heated to temperature either rapidly or slowly,[5] and produce the desired number of nodules

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Malleable Cast Iron

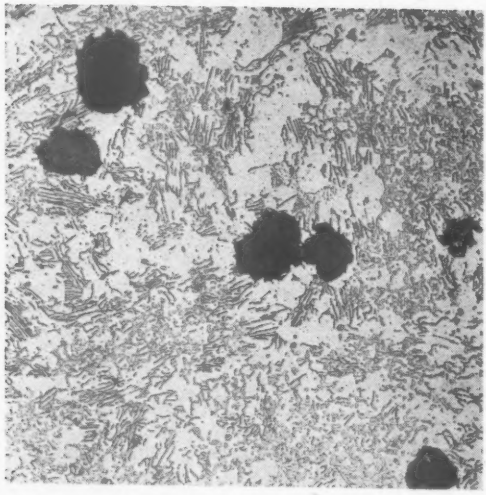

FIG. 7.—CENTRE OF UNBALANCED SULPHUR COMPOSITION —SPHEROIDAL NODULES (× 100).

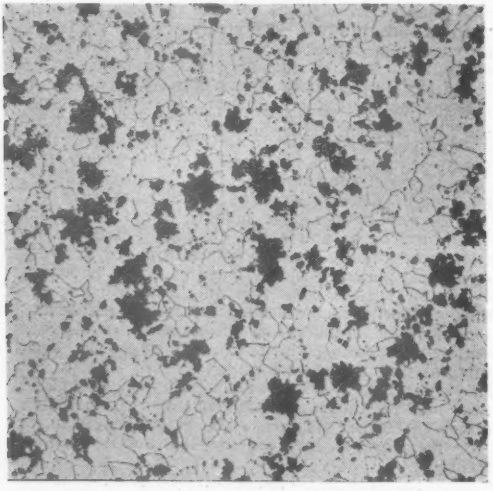

FIG. 9.—CENTRE OF BALANCED SULPHUR COMPOSITION —FLAKE GRAPHITE AGGREGATE (× 100).

per unit area, whereas white cast iron made from pig-iron B (apparently to identical analysis) may require raising to temperature very slowly, in order to produce the required number of nodules per unit area.

It is well known that if white cast iron be heated to 800 or 900 deg. C. and rapidly cooled,[2] the number of nodules formed in the subsequent normal anneal may be multiplied several thousand times.[6] Microscopic examination of the so-called prequenched white

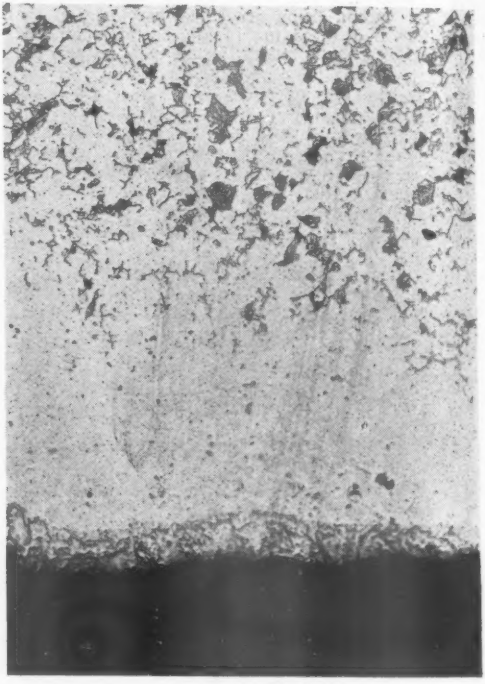

FIG. 8.—EDGE OF UNBALANCED SULPHUR COMPOSITION (× 100).

iron reveals no change in the cementite distribution, and the explanation may lie in the possible formation of very finely spheroidised cementite when the white iron is again heated.

There is some evidence that a slow rate of heating between 400 and 600 deg. C. markedly increases the final number of nodules in the Author's white iron; also that the presence of hydrogen[7] in the atmosphere surrounding the white cast iron markedly decreases the number of nodules formed. Schwartz[4] states that an increase in the nodule number has been observed when

the percentage of oxygen coming from the melt was increased. Morrogh[2] puts forward the interesting fact that spheroidal nodules are often formed around iron sulphide, which has a hexagonal crystal structure, that graphite flake aggregate nodules are often found deposited around manganese sulphide, which has a cubic crystal structure, and that it might be possible to relate the type of nodule to these different structures.

According to Schwartz,[4] graphitisation always occurs at the cementite-austenite interface, where one would expect the sulphides to be, and that graphite is deposited from the austenite solution and not from the cementite direct. It will be obvious that the nucleisation of graphite is a very complex problem. It requires further investigation, because, although the large batch type ovens normally used cannot be heated very quickly to temperature, and so mask these subtle differences, yet any attempt at rapid annealing in modern ovens must be governed by the above considerations. The introduction of a different pig-iron to the charge for melting may make the difference between success or failure, but the reason why apparently identical pig-irons should so vitally influence the result is so far not understood.

REFERENCES

1 "The Foundry," p. 93, January, 1946.
2 H. Morrogh—"The Metallography of Inclusions in Cast Iron and Pig-iron"—Journal, Iron & Steel Institute, No. 1, 1941.
3 A.F.A. Cast Metals Handbook, p. 309, 3rd Edn.
4 H. A. Schwartz—"The Principles of Graphitisation"—A.F.A. Transactions, July, 1942.
5 A. L. Boegehold—"Factors Influencing Annealing of Malleable Iron"—Transactions, A.F.A., p. 449, vol. XLVI.
6 H. A. Schwartz, H. H. Johnson and C. H. Junge—"Graphitisation of Prequenched White Cast Iron"—Translation, American Society for Steel Treating, p. 383, vol. 17, 1930.
7 H. A. Schwartz, G. M. Guiler and M. K. Barnett—"The Significance of Hydrogen in the Metallurgy of Malleable Cast Iron"—Translation, American Society for Metals, December, 1940. Also, C. H. Lorig and M. L. Samuels—"Some Effects of Hydrogen on the Time of Malleablisation"—Translation, A.F.A., July, 1942.

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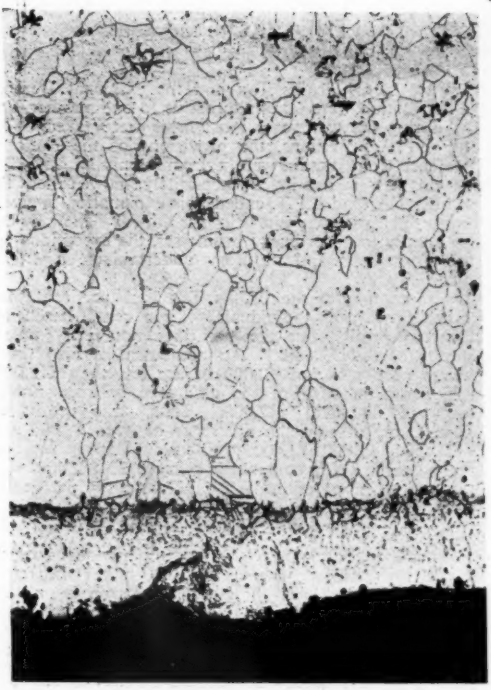

FIG. 10.—EDGE OF BALANCED SULPHUR COMPOSITION (× 100).

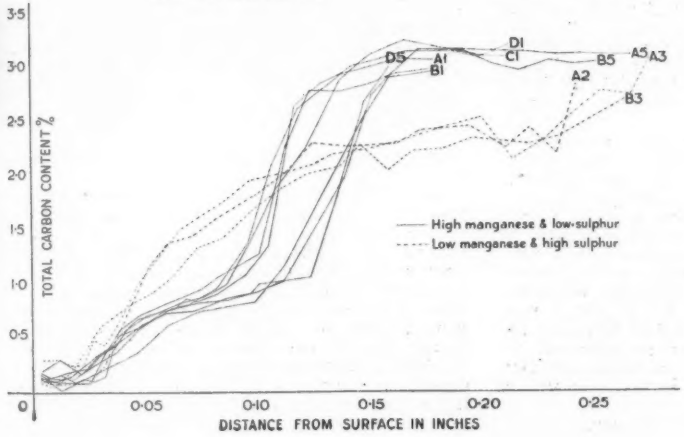

FIG. 11.—CARBON CONTENT SURFACE TO CENTRE.

THE PROFITS TAX

By F. J. TEBBUTT

The Excess Profits Tax and the National Defence Contribution were taxes alternative to one another, and as during the war years most firms were taxed under the E.P.T. provisions, the provisions of the National Defence Contribution were not commonly known. But as this tax is continued indefinitely, now called the Profits Tax, and E.P.T. ended, this explanation is given, up to date, with any alterations included. The new tax will apply to all ordinary businesses, the exceptions being professions and statutory undertakings, *e.g.*, gas, electricity, etc.

For companies the Profits Tax is 5 per cent., for other firms and individuals, 4 per cent., based on assessed profits, but the tax does not apply unless profits exceed £2,000. An abatement is also given where profits exceed £2,000 or are less than £12,000, this being one-fifth of the difference between profits above £2,000 and £12,000. Thus, take profits at £4,000, one fifth of the difference between £4,000 and £12,000 is £1,600, £2,400 profits would apply for tax, the actual tax for companies being £120 (£2,400 at 5 per cent.), for other firms, £96 (£2,400 at 4 per cent.).

How Profits are Assessed

Assessments are made for 12-month periods, according to the financial year ending date of the firm concerned, and roughly on the current year's profits, not as under Schedule D (business profits), income tax for the year preceding the year of assessment; payments are due one month after assessment. But the tax is based on income tax principle, with differences, however, also as regards procedure, income assessable, and deductions allowable.

Thus, interest (being loan interest, not payments for dividends or distribution of profits generally) annuities, and other annual payments and royalties are deductible as trading expenses. But on the other hand "annual value" where premises are owned, allowed under income tax, is not deductible for Profits Tax.

Income tax payments are not deductible for Profits Tax, but P.T. payments can be deducted for income tax purposes.

In the case of a director-controlled company, director's remuneration (except whole-time serving directors, those in managerial positions, full time, and not owning more than 5 per cent. of the ordinary share capital) is only deductible as a trading expense up to an amount not exceeding 15 per cent. of the profits, computed before deducting directors' remuneration or £1,500, which ever is the greater, but the deduction in no case can exceed £15,000. As regards this paragraph, individuals and partnerships (not a company) can, if they so wish, be considered as a director-controlled company and then can deduct as trading expenses an amount to the extent laid down for directors' remuneration the same as if a company as above, but then the tax would be

(*Continued at foot of next column.*)

CORES AND CORE BOXES

By "CHIP"

When complicated cores are required for small repetition castings, it is always possible, and often advantageous, to construct full-size models of the cores in wood. These models can then be used to determine the best way to construct the core boxes so as to facilitate ramming and drying of the cores.

Large cores, however, demand a different treatment: although at times they may prove as complicated and the method of manufacture as difficult to plan as for those of smaller castings. In such cases, instead of full-size models, a little carbon paper will often be found very helpful in obtaining a clear idea of the interior or core outline of a casting—an engine or air compressor cylinder, for example. The method is to trace the outline of the cores, together with their centre lines, as given on the various sections showing the interior of the casting, on a piece of paper. By folding these carbon tracings along their centre lines and placing them on a vertical plane in their relative positions, the result will be rather enlightening, for the coring required will readily be seen, and the manner in which the various cores may be made and placed together in the mould ascertained far easier than trying to follow two or three views on the drawing simultaneously.

Having gained a mental picture of the core, it will probably be found that, like most cores, several methods of manufacture present themselves. For large cores a rectangular frame filled in with the necessary material to produce the required form of core is probably best, as this method of constructing core boxes will be found advantageous in many respects. It saves the box the punishment it would otherwise receive by rapping, for all that is required when the box has been rammed up is to remove the clamps or bolts keeping it together, and draw the frame away. The material which forms the core box proper can now be removed piece by piece. These pieces, incidentally, should be fitted loosely into the frame, as they have a tendency to swell and tighten up in contact with the damp sand used.

(*Continued from previous column.*)

5 per cent.—not the 4 per cent. as would otherwise apply.

Wear and tear allowances for machinery and plant (the term, of course, is a wide one, including motor vehicles and fittings and fixtures) apply as for income tax, and also (with special modifications) the special depreciation allowance for depreciation of buildings, machinery or plant (provided since January 1, 1937) which have become redundant or have depreciated in value through the end of the war (the date to apply as this date for this purpose now given as December 31, 1946). Investment income which is assessable for income tax is not so for Profits Tax, except for special trades, *i.e.*, building societies, banking businesses and assurance companies.

CUPOLA OPERATIONS

LANCASHIRE BRANCH DISCUSSION

At a recent meeting of the Lancashire branch of the Institute of British Foundrymen, Mr. D. H. Young presented a Paper entitled "Cupola Operations." This Paper was originally published in the FOUNDRY TRADE JOURNAL for April 25, 1946.

Vote of Thanks

MR. J. JACKSON, proposing a vote of thanks to the lecturer, said a most commendable feature of the Paper was the way in which Mr. Young had dealt with the positive blast. It was very interesting to learn that the lecturer was keeping on with the old lines and achieving good results thereby. After MR. J. HILL had seconded, MR. YOUNG, in reply, said it was surprising to find cupolas being operated without any idea of the why and the wherefore of things being done. Mr. Jackson had referred to the positive blower, and he, the speaker, was afraid that on that score he was very conservative. They were obviously concerned with getting the air through, and fans could be a snare and a delusion. Remarks were sometimes made that the fan required less power than the positive blower, and the first cost was less. He was not so sure; if fan makers rated their motors so that they could supply the necessary volume of air under all conditions which might arise in the cupola, their price would go up and many foundrymen would be saved much trouble, they would then stick to the positive blower. If, through shortage of supply, it was necessary to fall back on steel scrap largely composed of small bits of flattened plates, then there was something like a shatter offering resistance to the flow of the air, and with the fan, there would be slips when such resistance was encountered, with no certainty that the air was passing through the cupola, whereas with every sweep of the positive blower, the air must move on.

DISCUSSION

MR. A. JACKSON said that Mr. Young had gone back to the pressure which was one of the things obtaining in the old days but a change had now been made. There was an idea prevailing that iron could not be melted as well on the old principle, but, in his experience, fairly good results had been obtained. Mr. Young advocated a positive blast and stated that pressure was not something to be taken into account. There were one or two points to be made clear. One had been mentioned with regard to the assemblies. How, and when, the blow was closing down should the blast be reduced? It had not been stated what was the principal reason why this should be done; it was really in order to save the lining of the furnace. When there was a full furnace the positive blast must reach the centre of the furnace, but as the weight was taken out it went further and further across until it struck the liners at the other side. Reducing the blast should effect a considerable saving on the lining and there would be less patching to be done.

It was advocated in the Paper that an extra charge should be added to the one that was finished. If good metal was essential to the end of the blow, this was certainly good practice.

Another point which might be mentioned was that some coke was received into the foundry yard which was much heavier than other kinds due to its being saturated with water. The controversy was whether this condition was better or worse or of no concern at all. Then there was the way the tuyeres opened during the whole of the blast. At the present time the firm with which he was associated had two furnaces running, one using a straight lining while the other was slightly concave. Theoretically the concave one was the better of the two, providing that the furnace man was good enough to maintain it. The straight line was safer. When the tuyeres were made up what was the best way to keep them open?

One method was to leave the tuyeres open a little in order to get the melt going in a natural way with the air to the top side of the furnace. If the tuyeres were open the air coming from the outside wall would, to some extent, clear the particular tuyere which was not open.

Incidence of Pressure

MR. YOUNG wished to convey the idea that pressure had to be overcome. It was for that reason he preferred the positive blower. The pressure was present, and, as had been stated, was largely determined by the nature of the coke, and, secondly, by the charge. These were factors about which foundrymen could do little or nothing, and the resistance they created to the flow of air had to be overcome. Whether the pressure rose, as it had done in his experience, 18 to 20 oz., he would not worry about it as long as he was getting the air through.

Dealing with the point raised concerning keeping the tuyeres clear and the erosion of the lining at the end of the melt, he felt that towards the end of the melt, when there was a curtain of slag solidifying over the tuyeres, the tuyere area was considerably reduced, which caused an increase velocity, and the cutting action of the air was therefore greater. This was not good for the linings.

As far as lining and patching were concerned, over a period of six years, with a total melting of 122,000 tons, his expenditure for patching was 5½d. per ton. When reviewing these figures he could not help but think there was not a great deal wrong with the practice of clearing tuyeres before the final blow down.

Wet Coke

With reference to wet coke, he was in the happy position that all his coke was stored indoors. He could not, however, think that wet coke gave better results than dry coke. Perhaps the reason why the claim was sometimes made for wet coke was due to the difference in the weight of air brought about by the height of the barometer and the temperature. On some days there was an extra 7½ or 10 per cent. increase in air, but

Cupola Operations

the foundryman was not usually aware of it. Keeping tuyeres clear was largely a question of area and of the correct velocity of air over the tuyeres. He was aware that some people had a feeling of dread with respect to large tuyere areas. This was unfounded. Provided the air system and the speed of air were correct, and there was the necessary penetration, there would not be any great difficulty experienced in keeping the tuyeres clear.

Consumption of Patching Material

MR. W. HOLLAND understood that Mr. Young's foundry was one of the largest of its kind under one roof in the British Isles. He would like Mr. Young to explain how much patching material was used after a blow of 75 tons, and also what was the life of the linings in the melting zone.

MR. YOUNG replied that the consumption of ganister and patching material for all purposes, ladles and cupolas, *i.e.*, four 15-ton per hour, and four 8-ton per hour cupolas, and about 30 ladles was under 5 tons per week. The cupolas were of the ordinary straight-lined type, lined with firebrick. After the first blow on a new lining, burning back to probably 2 in. a side would recur, and it was left at that. Here was brickwork which had burned back in the hot test zone, and in the process of burning back a hard glassy surface was formed. He could never understand why that surface should be hacked out and filled up with ganister, so he left it. It would be found, if the air conditions were right, that with any subsequent melts the rate of erosion diminished very rapidly, and he did nothing with it until there was a sufficient burning out to permit him to make it up with a 3-in. brick or scone. He followed this practice consistently.

The average life for his linings was approximately 4,800 tons per lining over a period of about 15 months. As far as lining costs were concerned, for the years 1940 to 1945, with a total melt of 122,346 tons, the cost was less than sixpence per ton. Those six years included three bad years, and he could produce figures which were considerably less.

He did not realise that he was in any way different from anyone else in this regard until a gentleman from Sheffield endeavoured to impress him with the good qualities of his ganister, and told him how successful it would be when used as a jointing material. When he re-bricked a cupola he did so with standard cupola brick, and instead of allowing a man to use a trowel and ganister he dipped the brick in a very thin slurry of fireclay, like a cement wash, and hammered the bricks up joint by joint without jointings of ganister.

Weight of Oxygen

MR. VAN DER BEN, dealing with the question of air-weight, or weight of oxygen, said variation had to be made in accordance with the atmospheric conditions, but another factor entered into the scheme of things. There could not be variation of air value without simultaneously varying the air velocity, and any variation in air velocity automatically affected the melting zone. Maintaining a constant weight did not maintain constant temperature and constant velocity.

Cupola operations balanced a number of factors. Something must be allowed for the skill of the operator as contrasted with what might be regarded as more academic, scientific control; the man who had the "know-how" could work to better purpose and to better advantage than an instrument.

Order of Charging

It was somewhat surprising to note the order of charging materials; this was a matter which was frequently debated. Was it correct to assume that in practice Mr. Young charged steel, then scrap, and finally pig, and was there a particular reason for that choice of order. His own preference would be to put in pig after the steel and scrap last, because the pig normally would probably have a lower combined carbon content than the returned scrap and so consequently have a somewhat higher melting point.

Personally he liked a positive blower, but he had had to work furnaces with fans and had no objection to them. A fan could be used as satisfactorily as a positive blower; it merely required careful control. If there was a volume control meter to the fan then the velocity must be supervised.

It would appear to be obvious there would be much waste heat going up the chimney stack and wet coke made no difference. If the coke was charged by weight, then the wet coke would involve a low charge by weight.

MR. YOUNG appreciated Mr. Van der Ben's remarks respecting the change in velocity. He had frequently considered the point, but it was desirable to keep the cupola the simple and efficient plant that it was. After all the change in the velocity was not very great, something in the region of 2 ft. per min., so that if the tuyere areas were ample there was not a serious danger of the zone shifting to any great extent; 32 in. appeared to be ample for all his conditions.

Dealing with the order of charging, all the scrap used was the shop returns. Irons with as low a silicon content as 0.5 per cent. to about 1.7 per cent., and carbons round about 3.3 per cent. or 3.4 per cent., were dealt with. The firm did not buy scrap. The order of charging, as he had laid it down, gave him good and consistent results. There had been many controversies in the past as to whether steel should be charged first or last. There was a period in the case of his firm's foundry when it was charged last, and at the end of each melt, when the cupola was dropped, a considerable quantity of steel was always recovered. After charging steel first there was none left in the drop, and the last ladles, as regards analysis, were as good as the earlier taps. Naturally if steel was charged as a dilutant, the total carbon and the silicon were increased, when steel was left in the drop, and it was for that reason that the method and the order of charging was adopted. It should be borne in mind, also, that the scrap such as liner heads was very heavy—8 in. at the bottom and 12 in. at the top, and weighing 2 to 3 cwt. per piece.

(*Continued on page* 66.)

RAMP IN METALS

By "ONLOOKER"

Consumers of non-ferrous metals are not likely to forget New Year's Day, 1947, in a hurry if only for the spectacular rise in prices which was announced. So far as lead was concerned an increase was confidently expected, since the November adjustment covered only copper and zinc, but for the most part £10 was regarded as about the maximum addition. Instead of that, £15 was the figure, making the price of this metal £70—well in excess of any previous quotation in its history. Before the war it stood at £15 and had, of course, in earlier years, been traded at much less. To say that the price is preposterous would be an under-statement and it must have serious repercussions in the building industry, the cable trade and for the battery makers, to mention only three of the interests concerned. The jump in copper and zinc certainly came as a surprise, for an adjustment was not expected so early in the year as the first day of January. The former metal was increased by £19 to £117, and the latter by £15 to £70. Neither of these creates a new record level, but it is many years since such levels were reached, and, as in the case of lead, the consuming trades are bound to suffer through having to face up to such extraordinary valuations of metals which have made their way in the development of the industry by being available nearly always at reasonable prices. Aluminium at £72 15s. makes copper at £117 look rather silly!

Behind the Scenes

Just what is going on behind the scenes in non-ferrous metals is not apparent, for the Ministry keep their own counsel and the trade is left guessing. Secrecy seems to be an integral part of all bureaucratic control, that is so far as the workings of the official mind are concerned, but industry is, of course, expected to render periodic returns of what is happening on their side of the fence. It will be remembered that recently the Ministry formulated a new decree having the effect of checking the buying power of consumers by limiting their cover to six months, but on January 1 it was known that matters had been taken a stage further by the withdrawal of permission to convert licences on the basis of the price ruling before the advance in values. This must have put many fabricators in a difficult position and doubtless more will be heard of this matter, but whether the trade will secure any redress may be doubted. Is it reasonable to connect these two edicts with another apparent change in Ministerial policy, *viz.*, a state of equivalence with the world price? Hitherto, it has been noticeable that the sterling price has lagged behind the world quotation as it moved upwards, and it was popularly supposed that the authorities pursued a system of *averaging* their purchases, thus striking a fresh balance perhaps every 3 months. It has been decided to let the cost to the consumer here be so far as is possible the equivalent of world value, industry has then certainly moved a step nearer to conditions of freedom of trading in metals. For example, there is talk of tin being advanced to £400, and in view of what has happened in zinc and copper, such a course would be consistent with the latest developments.

It is impossible to feel otherwise than dismayed at the heights to which non-ferrous metals have now risen under the system of bulk purchasing, which, if it means anything at all, surely suggests price stability over a year or so. A glance at the table of prices ruling at the end of March last year and those obtaining on the first day of 1947 will prove conclusively enough that there has been a phenomenal increase in values, nor would the writer dare to suggest that the end of the upward movement has been reached. To make matters worse, industry is straitened for supplies. There is a rationing scheme in lead and for this quarter there has been a further cut of 20 per cent. in the use of this metal for a number of purposes. In zinc, the supply position causes much anxiety to consumers, and with many the copper situation savours too much of hand-to-mouth to be pleasant. In tin, things are not so bad and there is, of course, a fairly big tonnage of non-ferrous scrap available—at a price! To employ a colloquial phrase: "Where do we go from here?" It is anybody's guess, but no great perspicacity is needed to foresee a violent reaction one of these days, when not only has consumption suffered from inflated values and declined, but production has been boosted unnaturally for the same reason.

HOUSE ORGANS

Bulletin of the British Steel Founders' Association, Vol. 1, *No.* 2. This second issue continues with the job of indicating to the designer of steel castings more of the principles fundamental to their manufacture. It carries an excellent article which stresses the problem of shrinkage by detailing some of the measures taken by foundrymen to negative the consequences of its impact. This article on feeder heads also happens to be most useful to the "men on the floor," so two birds have been killed with one stone.

Malleable Iron Facts, being bulletin No. 25 issued by the [American] Malleable Founders' Society.

Each of the four pages of this leaflet carries the headline, "Increase Production." Then, on each page, there are illustrations showing just how, by co-operation in design, a cheaper and better job has been produced. This is an excellent example of co-operative industrial publicity.

Foundry Practice, No. 83, dated September-October, 1946. The house organ of Foundry Services, Limited, Long Acre, Nechells, Birmingham, 7, contains articles on roll-making, the casting of a phosphor-bronze pinion, and several other practical contributions to foundry practice.

PIG-IRON AND STEEL PRODUCTION IN GREAT BRITAIN

The following particulars relating to pig-iron and steel production in Great Britain have been extracted from the Statistical Bulletin for November, 1946, issued by the British Iron and Steel Federation. Table I gives the production of pig-iron and ferro-alloys in October, with the number of furnaces in blast at the end of the month; Table II, production of steel ingots and castings in October; and Table III, deliveries of alloy and non-alloy finished steel. Table IV summarises the activities of the steel industry as a whole during the six months ended October, 1946.

TABLE I.—*Production of Pig-iron and Blast-furnace Ferro-alloys (Thousands of tons.)*

District.	Furnaces in blast, 2.11.46	Weekly average production, October, 1946. Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derby, Leics., Notts., Northants, and Essex	26	—	16.0	20.4	1.6	—	38.0
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Ches.	5	—	6.1	—	—	0.4	6.5
Yorkshire (incl. Sheffield, excl. N.E. Coast)							
Lincolnshire	11	—	20.9	—	—	—	20.9
North-East Coast	26	6.0	30.1	0.5	—	1.9	38.5
Scotland	10	0.6	8.4	2.6	—	—	11.6
Staffs., Shrops., Worcs. and Warwick	7	—	5.5	1.2	*	—	6.7
S. Wales and Monmouthshire	7	2.6	18.0	—	—	—	20.6
North-West Coast	7	11.8	—	0.2	—	1.0	13.0
Total	99	21.0	105.0	24.9	1.6	3.3	155.8
September, 1946	98	19.6	101.2	22.8	1.3	2.4	147.3
October, 1945	100	21.1	101.8	19.1	0.9	3.2	146.1

TABLE II.—*Production of Steel Ingots and Castings. (Thousands of tons.)*

District.	Weekly average production, October, 1946. Open-hearth. Acid.	Open-hearth. Basic.	Bessemer.	Electric.	All other.	Total.* Ingots.	Total.* Castings.	Total ingots and castings.
Derby., Leics., Notts., Northants, and Essex	—	—	(Basic) 9.2	1.1	0.3	10.1	0.5	10.6
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Ches.	0.9	20.7	—	0.5	0.4	21.6	0.9	22.5
Yorkshire (excl. N.E. Coast and Sheffield)								
Lincolnshire	—	24.8	—	—	0.1	24.8	0.1	24.9
North-East Coast	3.5	47.1	—	0.6	0.4	50.3	1.3	51.6
Scotland	4.9	24.1	—	0.6	0.6	28.6	1.6	30.2
Staffs., Shrops., Worcs. and Warwick	—	13.4	—	0.5	0.6	13.5	1.0	14.5
S. Wales and Monmouthshire	6.9	42.1	(Basic) 4.9	0.6	0.1	54.3	0.3	54.6
Sheffield	7.8	23.2	—	6.4	0.6	36.5	1.5	38.0
North-West Coast	0.5	2.8	(Acid) 4.0	—	0.1	7.3	0.1	7.4
Total	24.5	198.2	18.1	10.3	3.2	247.0	7.3	254.3
September, 1946	22.9	187.4	15.2	9.8	3.2	231.3	7.2	238.5
October, 1945	24.8	188.1	17.4	9.4	3.3	236.0	7.0	243.0

[*Including alloy]

TABLE III.—*Deliveries of Alloy and Non-alloy Finished Steel (Thousands of tons.)*

Product.	Weekly average. 1944.	1945.	1946. October.	1946. September.	1946. October.
Non-alloy steel:					
Heavy rails and sleepers	6.5	7.1	6.1	8.0	7.8
Heavy and medium plates	30.8	26.4	27.7	35.2	34.9
Other heavy steel products	38.2	33.1	29.0	35.1	35.5
Light rolled products (excl. wire rods and alloy steel bars)	46.2	41.9	45.0	54.3	54.2
Ferro-concrete bars	2.1	1.8	1.7	3.1	3.0
Cold-rolled strip	4.2	4.0	3.7	4.9	4.7
Bright steel bars	4.9	3.9	3.6	5.2	5.5
Sheets, coated and uncoated	21.2	20.2	20.7	24.9	24.8
Tin, terne-and black-plate	10.0	9.5	9.3	10.9	12.4
Tubes and pipes	12.3	10.9	11.6	15.0	15.4
Steel wire	12.2	10.2	10.4	13.1	12.4
Tyres, wheels and axles	2.6	2.5	2.6	4.2	4.1
Forgings	5.9	5.3	4.8	5.2	4.9
Castings	5.1	4.1	3.0	3.0	3.2
Total	202.2	180.9	179.2	222.1	222.8
Alloy steel: *					
Plates	1.9	1.1	0.6	0.3	0.1
Tubes and pipes	0.6	0.3	0.1	0.3	0.2
Bars, sheets, strip and wire	5.6	3.0	2.7	3.2	3.4
Drop forgings	3.0	1.6	1.3	1.3	1.6
Other forgings	2.0	0.6	0.4	0.4	0.4
Castings	1.7	0.9	0.7	0.5	0.7
Total	14.8	7.5	5.8	6.0	6.4
Total U.K. production†	217.0	188.4	185.0	228.1	229.2
Less Intra-industry conversion	24.5	17.8	18.6	20.4	20.1
Total net U.K. deliveries	192.5	170.6	166.4	207.7	209.1
Add Deliveries of imported finished steel	5.0	1.0	0.1	—	—
Total deliveries of finished steel	197.5	171.6	166.5	207.7	209.1

* Excludes high-speed steel.

† Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.

(*Continued at foot of next page*)

PERSONAL

MR. L. RIPLEY, principal Lloyd's surveyor for steel at Middlesbrough, has retired after 27 years' service.

SIR EDWIN NOEL PLOWDEN has been appointed a director of the British Aluminium Company, Limited.

MR. S. THOMSON, general manager of the Lanarkshire Steel Company, Limited, has been appointed a director.

MR. N. M. NIVEN has been appointed an additional director of G. & J. Weir, Limited, Holm Foundry, Cathcart, Glasgow.

MR. KENNETH E. SUMMERS, managing director of the Newall Engineering Company, Limited, is in the United States on a business trip.

MR. A. H. HIRD, who is in charge of engineering sales of Vickers-Armstrongs, Limited, has been appointed a director of the company.

MR. B. G. W. ATTWOOD has been elected a director of the Plessey Company, Limited, in place of MR. W. O. HEYNE, who has resigned.

MR. W. W. F. SHEPHERD, chairman of Turner & Newall, Limited, and associated companies, has joined the board of the District Bank, Limited.

MR. A. S. TANNER has been appointed an alternate director to MR. J. C. MAHANNAH on the board of the Kelsey-Hayes Wheel Company, Limited.

MR. ANDREW HORNE has retired after 43 years' service as a bath moulder with M. Cockburn & Company, Limited, Gowan Bank Ironworks, Falkirk.

MR. O. R. GIBBON, a director of the Wear Winch & Foundry Company, Limited, Sunderland, has retired after 22 years' service with the company.

MR. F. W. HALL, secretary of the brassfoundry section of Wm. Doxford & Sons, Limited, Sunderland, has retired after 55 years with the company.

MR. T. NORMAN SCOTT, chief clerk for 16 years with Smith's Dock Company, Limited, North Shields, has retired. He was with the company over 40 years.

MR. ROBERT HOWATT has been appointed chief engineer of the Steel Company of Scotland, Limited. He joined the company in 1939 as senior draughtsman.

MR. NOEL B. BROOKS has been appointed a director of Richard Johnson & Nephew, Limited, copper and aluminium wire drawers and rollers, etc., of Manchester.

MR. L. S. ROCKEFELLER, of New York, has been elected a director of the International Nickel Company of Canada, Limited, in succession to the late Mr. T. Morrison.

ENGINEER REAR-ADMIRAL F. V. KING has been appointed technical consultant for the shipbuilding and marine interests of Tubes, Limited, and the Chesterfield Tube Company, Limited, subsidiaries of Tube Investments, Limited.

SIR FREDERICK BAIN, deputy-president of the Federation of British Industries, was nominated president of the Federation at a meeting of the F.B.I. Grand Council last week. He is a deputy-chairman of Imperial Chemical Industries, Limited.

MR. WILLIAM USHER, manager of the Glasgow office of Fry's Metal Foundries, Limited, was presented with a gold watch at a luncheon to mark his retirement. Mr. Usher, who has been with the company for 24 years, is succeeded by his son, MR. WILLIAM LORIMER USHER.

SIR SAMUEL BEALE has retired from the chairmanship of John Lysaght, Limited. He is succeeded by SIR CHARLES BRUCE-GARDNER. It was announced recently that Sir Charles had been released by the President of the Board of Trade from his post of Chief Executive for Industrial Reconversion. Sir Samuel Beale will retain his seat on the board of the company.

PIG-IRON AND STEEL PRODUCTION IN GREAT BRITAIN (*Continued from previous page.*)

TABLE IV.—*General Summary of Pig-iron and Steel Industry.* (*Weekly average in thousands of tons.*)

Period.	Iron-ore output.	Imported ore consumed.	Output of pig-iron and ferro-alloys.	Scrap used in steel-making.	Steel (incl. alloy).			Steel stocks held by producers, etc.*
					Imports.	Output of ingots and castings.	Deliveries of finished steel.	
1944	297.6	46.8	129.5	141.7	26.6	233.5	197.5	2,171.0
1945	272.5	77.2	136.7	138.5	2.9	227.3	171.6	1,683.9
1946—May	244.9	115.1	151.2	159.1	10.6	261.8	203.4	1,146.1
June	225.5	118.7	151.5	142.9	9.0	239.8	191.8	1,130.7
July	220.3	119.4	147.0	137.5	6.5	226.1	176.6	1,160.6
August	223.6	118.9	145.3	134.9	10.2	226.0	172.9	1,198.9
September	229.3	118.4†	147.3	144.8†	13.3	238.5	207.7	1,186.8
October	230.2	126.3	155.8	153.6	10.8	254.3	209.1	1,103.9

* Stocks at the beginning of the years and months shown. † Revised.

NEWS IN BRIEF

REORGANISATION OF THE capital structure of Sterling Industries, Limited, is envisaged.

THE FIRST international trade fair in Canada will be held in Toronto from May 31 to June 12, 1948.

THE BOARD OF TRADE announce that the token import scheme has now been extended to Luxemburg.

THE NEW ADDRESS of the British Colour Council is 13, Portman Square, London, W.1 (telephone: Welbeck 4185).

THE ADDRESS OF THE Sheffield office of the Woodall-Duckham Company is now 448, Abbeydale Road, Sheffield, 7 (telephone: Sheffield 52715).

THOMAS SUMMERSON & SONS, LIMITED, railway plant manufacturers, etc., of Darlington, introduced a five-day working week of 42½ hours on January 6.

NEGOTIATIONS ARE CONTINUING for setting up a new industry on the site of the old Northumberland Shipbuilding Company's yard at Howden-on-Tyne.

R. & D. JONES, LIMITED, of Liverpool, shipping agents for the Darwen & Mostyn Iron Company, Limited, have recently celebrated their centenary.

ALEXANDER GOTHARD & PARTNERS, consulting engineers, announce that their address is now 8, Adam Street, Adelphi, London, W.C.2 (telephone: Temple Bar 4688).

A £750,000 CONTRACT FOR the supply of automatic telephone equipment has been concluded between the Automatic Telephone & Electric Company, Limited, and the Polish Post Office.

THE MODERN HOMES EXHIBITION is to be held at Dorland Hall, Regent Street, London, S.W.1, from March 25. The organisers, the "Daily Herald," are making every endeavour to make the exhibition as practical as possible.

VICKERS-ARMSTRONGS, LIMITED, have acquired a substantial interest in Cockatoo Docks Engineering Company Pty., Limited, shipbuilders and repairers, dry dock and slipway owners, marine and general engineers, of Cockatoo Island, Sydney.

CAMMELL LAIRD & COMPANY, LIMITED, have refused to agree to the introduction of the five-day working week at their Birkenhead shipyard. The next move depended on national negotiations, said Sir Robert S. Johnson, chairman of the company.

REVIEWING SHIPBUILDING PROSPECTS for 1947, Mr. F. C. Pyman, managing director of William Gray & Company, Limited, West Hartlepool, said that if working hours were reduced, shipbuilding firms would have to go back on delivery dates arranged for new ships.

ADDITIONAL ARRANGEMENTS for the exchange of German technical information acquired by the two nations since VE-Day have been announced in a joint statement by Sir Stafford Cripps, President of the Board of Trade, and Mr. W. A. Harriman, U.S. Secretary for Commerce.

THE COMPLETION OF machines worth hundreds of pounds was being held up because of the lack of a set of ball bearings worth 25s. 6d., said Mr. R. A. Cookson at a meeting of Newcastle and Gateshead Chamber of Commerce. He said that ball bearings similar to those needed, made in Britain, had been exported and could be bought on the Continent.

AGREEMENTS FOR HOLIDAYS with pay, which now operate in practically all industries in which conditions of employment are determined by collective bargaining and which have also been enforced by wages councils and boards, now cover between 11,000,000 and 12,000,000 wage-earners, apart from the large number of other workers, such as clerks and salaried workers generally, to whom they are granted, states the "Ministry of Labour Gazette."

"AND SO TO WORK" is the title of an exhibition opened by Mr. George A. Isaacs, Minister of Labour and National Service, on a site in Oxford Street, London, W.1, last week, which demonstrates the conquest of disablement and the process of rehabilitation and resettlement from hospital to training centre. The exhibition shows what can be, and is being, done to rehabilitate the victim of war service, an accident, physical weakness, or serious illness.

THE BOGY CALLED INFLATION was a very real bogy and it could happen in Britain, said Mr. J. W. Belcher, Parliamentary Secretary to the Board of Trade, at Leeds last week. Warning against the stealthy manner in which inflation could overtake a nation, he said first came a little rise in prices, followed by the demand for higher wages. "This contributes to further rises in prices and further demands for higher wages, and before you know where you are, you are well set on the vicious spiral," he added.

IN VIEW OF THE difficulties likely to show themselves over the next few years in securing young entrants to the engineering industry, the British Engineers' Association's stand at the "Schoolboys' Own" exhibition in London was of particular significance. A well-constructed "chart of opportunity" was provided, showing the entry age and possible stages of progress for "trade apprentices," "student apprentices," and "graduate apprentices." A large number of typical engineering manufacturers' training scheme brochures was also available.

"THE SUCCESS of the fair has far exceeded the council's wildest expectations," said Mr. G. Williams, chairman of the Industrial Development Council of Wales, speaking of the Welsh Industries Fair in London, which ended last week. A series of similar fairs would be held throughout the United Kingdom, he said. Some heavy exhibits costing up to £10,000 were sold several times over. At a rough computation, home and oversea orders totalled about £5,000,000. Attendance exceeded 39,000 and buyers came from all five continents.

IN A STATEMENT circulated with the annual report and accounts, Mr. W. W. F. Shepherd, chairman of Turner

& Newall, Limited, says that considerable progress has been made during the past financial year in the restoration of their export trade to its pre-war level. Indeed, in some cases, pre-war volume has already been significantly exceeded. Speaking of future prospects, he says he is convinced that the year or two immediately ahead are full of promise, and that their mines and major factories throughout the world are likely to remain very busy for some time to come.

IN ANNOUNCING THAT arrangements have now been made to allow business men to visit the British and American zones in Germany for commercial purposes, the Board of Trade states that, owing to the very limited facilities in accommodation and transport, applications can only be considered from persons having a specific purchasing transaction in view. Applications should be made in the first instance to the Sundry Materials Branch of the Board of Trade, 10, Old Jewry, London, E.C.2. Imports from Germany will continue to be handled by the Sundry Materials Branch.

BRITISH SCIENTISTS are working at "feverish speed" so that we shall be able to use atomic energy for industrial purposes, Dr. T. E. Allibone, head of the research laboratories of Associated Electrical Industries, Limited, and for two years one of the Anglo-American team of scientists perfecting the atom bomb in the United States, said recently. Prof. Oliphant, the Australian atomic scientist, who arrived at Sydney from London recently, said that big British firms were showing great interest in the economic uses of atomic energy. He predicted that it could be harnessed for industrial purposes within five years.

THE DIRECTORS OF Taylor Bros. & Company, Limited, Trafford Park Steel Works, Manchester, gave a dinner at the Midland Hotel, Manchester, on New Year's Eve to mark the retirement from the company of Mr. T. L. Taylor, chairman and managing director, who joined the company in 1899; Mr. G. R. T. Taylor, a director and former chairman, who joined the firm in 1894; and Mr. J. L. Herbert, a member of the board, who has been associated with the company since 1892. Mr. F. Pickworth, managing director of the English Steel Corporation, Limited, has been appointed chairman of Taylor Bros. & Company, and Mr. R. G. H. Taylor, formerly assistant managing director, has been appointed managing director.

SPEAKING AT A Press conference last week, Mr. S. C. Leslie, Director of the Council of Industrial Design, said unofficial estimates of the volume of orders resulting from the "Britain Can Make It" exhibition varied from £25,000,000 to £50,000,000. It was impossible to give any reliable estimate of the real figure. Two facts, however, were clear: "Britain Can Make It" had brought trade orders to Britain in very great volume, which would not have been received if the exhibition had not been held. Secondly, it was plain from the statements of a large number of exhibitors that any gaps which existed in their order-books when the exhibition opened had now been filled to overflowing. It was not the intention of the Council to rest upon the success of that single exhibition.

UNITED STEEL COMPANIES' ISSUE

The directors of the United Steel Companies, Limited, have decided to issue 1,713,546 4½ per cent. cumulative preference shares of £1 each at 24s. per share and to offer the shares to the preference and ordinary stockholders on the register at December 27. The new shares will rank for dividend as from February 1 next.

In his speech at the last annual meeting, Sir Walter Benton Jones, the chairman, described the company's proposals for development and expansion within the framework of the industry's post-war development plan. This programme is likely to be spread over the next seven years, and it is expected that much of the cost will be met from the company's current resources and from the compensation which will be received from the National Coal Board for their colliery interests. New capital will, however, be required to cover the total expenditure contemplated. Work is already in progress on a number of important schemes, and it is expected that by the end of the current financial year the company will require a certain amount of new capital to meet the cost of this work.

COPPER DEVELOPMENT ASSOCIATION'S ACTIVITIES

Plans for a considerable expansion of the activities of the Copper Development Association have been put into effect and all departments have now come into full operation. The Association's annual report, in which this announcement is made, states that considerably more work is currently being undertaken, with satisfactory results, than at any time before. The new headquarters at Kendals Hall, Radlett, have been operating throughout the year and have proved very satisfactory.

The heavy demand for the Association's publications has been such that difficulty has been experienced in maintaining sufficient stocks. While the major part of the demand arises from this country, requests from overseas are substantial. The Association's technical records have continued to expand and they comprise one of the most valuable collections in existence of carefully selected technical information on copper and its many applications.

LIMITING FACTORS TO EXPORT TRADE

Mr. H. A. Marquand, Secretary for Overseas Trade, speaking in London last week, said instead of the Government's estimate of a total export of £750,000,000 the figure for the year would be nearer £900,000,000. The effort to raise that figure by the 50 per cent. above the present level necessary in order to pay our way as a nation, would, however, have to be much greater than in 1946. It was not to be expected there would be much visible expansion achieved early in 1947. Shortage of coal, steel, linseed oil, and other commodities were formidable limiting factors. One of the outstanding features of the year had been full employment, he said.

CUPOLA OPERATIONS

(*Continued from page* 60.)

Blowers and Fans

Dealing with the subject of positive blowers and fans, he, too, would undertake to work with fans, but he had no desire to be at the cupola all the afternoon. If he had four cupolas working he set his volume gauge and the blower, and was confident that he could return in 1½ hrs. and there would still be correct operation. A fan would need much more attention.

MR. R. YEOMANS observed that Mr. Young had stated that every cupola was a law unto itself. Probably it would be more correct to say that every cupola had a law unto itself. How could any cupola be a law unto itself? How could Mr. Young be sure that every one of his tuyeres passed an equal amount of air? In the Paper, as published, it was stated that the coke, because of its density or structure, tended to burn unequally. How much overcharging would be necessary?

MR. YOUNG thought that the statement that every cupola was a law unto itself was really incorrect. It required qualification. There were cupolas working which appeared to defy all law; no thought having been given to their design. It was a pity that cupolas would work under such conditions, otherwise improvements in their design would not have been so long delayed.

He could not be definite with respect to every one of his tuyeres passing an equal amount of air. It was in order to ensure such a happy state of affairs that there was a very ample wind belt functioning as a reservoir. He could only be guided by an examination of the cupola after every blow. If there was an even wear round the melting zone he felt justified in thinking that the tuyeres were passing an equal quantity of air, or as nearly so as not to matter. He thought they were doing so, and was confirmed in that opinion by the fact that the erosion at the two tuyeres adjacent to the slag hole was slightly greater, due to the escape of air at this point.

U.S. NATIONAL FOUNDRY COUNCIL

The United States of America, like France, now possesses an organisation embracing the whole of the foundry industry. At a recent meeting held in New York, the American Foundrymen's Association; Foundry Equipment Manufacturers' Association; Foundry Supply Manufacturers; Gray Iron Founders' Society; Malleable Founders' Society; National Founders' Association; Non-Ferrous Founders' Society, and the Steel Founders' Society of America, decided to co-operate as the National Castings Council. Two representatives from each body, one of whom is to be the president, will form the council. No funds are to be raised.

MR. HOWARD A. STOCKWELL, treasurer of the Barbour Stockwell Company of Cambridge, Mass., has been elected president of the [American] Gray Iron Founders' Society.

PUBLICATIONS RECEIVED

An Industrial War Record.—A review of Stewarts and Lloyds, Limited, of London and elsewhere.

Each one of these brochures, which have been published by the large firms detailing their wartime activities and experiences, has its own appeal. This one seems to address it more particularly to the technician, for only those who have been through the mill could appreciate just what the installation of New Crown Forgings really involved. To mass-produce shell forgings at the rate of one every 12 seconds was indeed an accomplishment of real merit. It was not only the production which calls for commendation, but the actual construction of the plant. It was of such a character that no fewer than 62 were either installed by Stewarts and Lloyds in their own works or in the works of others located either at home or abroad. The difference between this method and earlier ones was that the hollow forging was so good that no internal machinery was necessary. It was natural that having acquired this experience with ammunition, other types would be entrusted to them, and in sum, some 90 odd millions of shot and shell were manufactured during the war period. This output involved the employment of a staff of 9,000, of whom 56.6 per cent. were women.

Another wartime achievement to which Stewarts and Lloyds made a major contribution was Pluto—the pipe line under the ocean. Then there were 15,000 miles of tube used for beach defences, and other considerable quantities used for a thousand and one applications for the army, navy, air force, and essential services. The brochure is excellently illustrated, attractively bound in cream linen, and jacketed in an excellent example of four-colour printing.

The Aluminium Development Association—Its Aims, Activities and Organisation. Published from its head office, 33, Grosvenor Street, London, W.1.

Not all development associations operate on exactly the same lines, and it was wise for the council of this comparatively new association to publish in convenient form such a statement. For those of our readers engaged in the manufacture of aluminium castings, there has been created a free service of outstanding usefulness. Moreover, their wider interests are being catered for by the general issue of propaganda matter for aluminium. The issue of this booklet should go far towards popularising the co-operative services offered, and readers would be well advised to write for a copy.

GERMAN TECHNICAL REPORTS

Among the latest reports on German industry issued by the British Intelligence Objectives Sub-Committee, and the Field Information Agency, Technical, are two of interest to the foundry industry. They are:—

B.I.O.S. 527—Iron, steel and non-ferrous metal works plant and machinery (price 10s. 8d., post free); and F.I.A.T. 782—The production of dense, non-porous bronze castings (2s. 2d.).

STANTON-DALE
REFINED PIG IRON

Manufactured to guaranteed analyses in seven standard grades. Also obtainable to individual specification

THE 17-TON CASTING ILLUSTRATED IS ONE OF A SERIES MADE IN A STANTON FOUNDRY FROM STANTON DALE IRON

1. Core being lowered into mould
2. Pouring the metal
3. Finished casting in transit

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STANTON IRONWORKS
COMPANY LIMITED
NEAR NOTTINGHAM

NEW COMPANIES

("Limited" is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London, W.C.2.)

A. M. Engineers, 2, Clements Inn, London, W.C.2—£3,000. M. B. Scott.

Garratt Ironworks, Bradgate Street, Leicester—£1,000. D. E. Weir and W. C. Garratt.

Stove Equipments, Mart Lane, Burscough, Lancs.—£1,000. R. W. Griffiths and W. Burns.

Eiffel Foundry Company, 89, Moss Lane, Swinton, Lancs.—£2,000. A. Livingstone and D. Litterick.

Sellers & Batty, 46, South Street, Stanground, Hunts. Welders, etc. £1,500. W. Sellers and E. W. Batty.

Associated Steels & Tools Company, 1, St. James Street, Sheffield—£20,000. S. A. and F. E. Grayson.

Westwood Switchgear—£10,000. W. F. Ellis, 42, Tenterden Drive, Hendon. London, N.W.4, subscriber.

J. W. Teale, Styrrup Works, Styrrup, near Doncaster—Engineers. £5,000. J. W., S. and T. S. Teale.

British Metalcraft Company—£10,000. S. C. Rodgers, 6, Upper Wellington Road, Brighton, 7, subscriber.

Ankrett (Crankshaft & Bearing), Parting of the Heaths, Foleshill Road, Coventry—£1,000. T. and A. Ankrett.

Elect Metals (Glasgow), 79, West Street, Glasgow, C.5—£2,000. C. M. and E. L. Annan, and J. S. Lamont.

A. M. Russell, 213, Balgreen Road, Edinburgh—Agricultural engineers. £18,000. M. Russell and R. A. Hamilton.

Murray & Matthews, 255, Lordship Lane, London, N.17—Ironfounders, engineers, etc. £7,500. E. Matthews.

H. L. Bolton Engineering Company, 106, Queens Head Road, Birmingham, 21—£7,000. H. L. and M. Bolton.

James Hesketh & Company, Bennett Works, Countess Lane, Radcliffe—Engineers, etc. £1,000. J. and H. Hesketh.

Rogan & Dawson, Hopton New Road, Mirfield, Yorks.—Engineers. £5,000. C. H. sen., C. H. jun., and H. Rogan.

Leytonstone Chromium & Nickel Plating Company, 748, High Road, London, E.11—£2,000. J. R. and C. H. Robinson.

Clayton-le-Moors Metal Spinning Company, 3 & 5, Mill Street, Clayton-le-Moors—£2,000. J. W. Jackson and T. Hollister.

John Boyd & Company (Engineers), Seafield House, Annan—Iron and steel founders, etc. £10,000. J. and R. A. Boyd.

Sanders & Bowers, Globe Works, Penistone Road, Sheffield—Manufacturer of blank forgings and stampings, etc. £3,000.

Lenfield Engineering Company, Lenfield House, Maidstone—£25,000. R. W. C. and R. T. C. Boucher and H. G. Brown.

Castle Donington Engineering Company, 8, Gower Street, Derby—£4,500. R. Wragg, J. A. and W. Tomlinson, and J. McLean.

Lloyd Worrall, Spencer House, South Place, London, E.C.2—Importers and exporters of metals, machinery, etc. £1,000.

Essandem Works & McPherson, 33, Great Charles Street, Birmingham—Engineers, etc. £2,000. E. F. Hayes and W. E. S. Salt.

Clarke Ellard Engineering Company, Works Road, Letchworth, Herts—£10,000. A. H. Clarke, W. G. Ellard, and L. G. Tubbs.

J. E. Rangeley, 2, Broadhalgh Avenue, Bury Road, Rochdale—Steel constructional engineers, etc. £1,000. J. E., J., and E. Rangeley.

South Cornwall Engineering Company, St. Mawes, Cornwall—£3,000. P. W. Dane, M. M. Preston, H. L. Chasmar and C. Marshall.

Clutton Welding & Constructional Company, North End Road, Clutton, near Bristol—£1,000. L. G. Pritchard and L. G. Crow.

Baker & Son (Birmingham), 137, King Edwards Road, Ladywood, Birmingham—Engineers, machinists, etc. £2,000. C. W. Baker.

Austin & Lang (Sales), Gunite House, Great West Road, Brentford—Manufacturers of machinery, non-ferrous metals, etc. £1,000.

Mac-Lav-Ac Corporation — Industrial research chemists and engineers, etc. £1,000. G. E. Sadler, Raydons House, Dagenham.

Hinton Jones (Engineers)—£5,000. M. H. Jones, 117, Prince's Park Avenue, Golder's Green, London, N.W.11, and C. W. Moxom.

Cloverhill Trading Corporation, Copthall House, Copthall Avenue, London, E.C.2—Manufacturers of metals, tractors, etc. £1,000.

James Evans & Son, Victoria Works, Spon Lane, West Bromwich—Wire drawers and manufacturers, etc. £10,000. F. J. and J. Evans.

S.A. Engineers (Llanelly), National Provincial Bank Chambers, Five Ways, Birmingham, 15—£20,000. W. Neale and C. L. de Laporte.

Burbage Engineering Company, Hazlemere, Burbage Lane, Coventry—£1,000. A. L. Dunn, S. J. Crompton, J. J. T. Baseley, and A. Wiggall.

W. Clayton & Sons, The Garage, Gilberdyke, East Riding—General engineers, etc. £5,000. W., W. A., G. A., F. C. and J. D. Clayton.

First Cousins!

This tank wagon, long familiar to industry, is a first cousin to the household vacuum flask, for the same principle is used to prevent its contents, liquid oxygen at minus 183° C., from evaporating on the journey. This service, developed by the British Oxygen Company Ltd. for industries that use large quantities of oxygen, saves handling cylinders. The oxygen tanker carries about eight times as much as a similar vehicle loaded with cylinders. On arrival at the works where it is to be used, liquid oxygen is piped like petrol into a reservoir. There it is evaporated and the gas carried through pipe lines, ready to serve any and all of the many processes in which oxygen is used for the welding, cutting and conditioning of metals.

THE BRITISH OXYGEN CO. LTD. London & Branches

Hampton Castings, Mount Works, Tower Street, Birmingham—£1,000. B. J. Barker, H. S. Rowley, T. H. Barlow and S. J. Sutton.

Warner-Parr, Four Pillars Works, Wrotham Heath, Kent—Mechanical and general engineers, etc. £2,000. G. W. Parr and W. F. Rickard.

Harvey & Longstaffe, Old Mill, Holt Town, Beswick, Manchester—Patternmakers, etc. £1,000. J. J. Harvey, B. Longstaffe and S. G. Harrison.

Milford-Astor Manufacturing Company, 114, Barlow Moor Road, Manchester, 10—Manufacturers of machinery, etc. £2,500. W. E. Image.

Burtonhead Trading Company, Burtonhead Road, St. Helens—Metal and ore merchants. £3,000. J., P. and D. I. Hampson and W. Poole.

Tipper Industries, 85, Edmund Street, Birmingham, 3—Malleable and grey-iron founders, etc. £150,000. H. and J. F. Tipper, and F. Taylor.

Cora, 16a, Stamford Road, Dalston, London, N.1—Toolmakers, engineers, etc. £2,000. T. L. Horabin, S. Rachmilewitsch and P. L. Cohen.

H. Barber (Wilmslow), Dean Row, Wilmslow, Ches.—Mechanical, electrical and general engineers, etc. £2,000. B. A. Wickens and R. Read.

Gunn Bros., 40, Bampton Street, Tiverton, Devon—Manufacturers of electrical and mechanical apparatus, etc. £2,000. F. W., E. and M. Gunn.

Lowerwood Engineering Company, Buxton Road, Horwich End, Whaley Bridge, Derbyshire—£10,000. R. S. and M. A. Bann, and M. H. Billitt.

DEATH OF DR. J. W. DONALDSON

The sudden death is announced of Dr. J. W. Donaldson, metallurgist to Scotts' Shipbuilding & Engineering Company, Limited, Greenock, which occurred on Sunday night in Glasgow. Dr. Donaldson was a graduate of Edinburgh University, and was the first metallurgist to be awarded a doctor of science degree for a thesis dealing with foundry practice. Since joining the Institute of British Foundrymen in 1919, he has made a major contribution to its Proceedings, his work being recognised by the award of the Oliver Stubbs' medal in 1928. He took a special interest in Scottish metallurgical activities, and presided with distinction over a number of district societies, including the Institute of British Foundrymen.

Dr. Donaldson's extensive original research work was invariably well documented and concisely presented. Spread over most of the technical institutes and in the technical Press, his Papers and articles will long be a model for the rising generation. His two major hobbies were yachting and philately. His published work provides a lasting testimony to his erudition and energy, but, great as it is, it cannot mitigate the loss to his friends of his truly charming personality.

CONTRACTS OPEN

Any date given is the latest on which tenders will be accepted. The address is that from which forms of tender may be obtained.

Bootle, January 25—Pipes, gullies, cast-iron manhole covers and gully grates, etc., for the Corporation. Mr. W. A. Harrison, borough engineer and surveyor, Town Hall, Bootle.

Felixstowe, January 31—Castings, for the Urban District Council. Mr. A. H. Pavitt, engineer and surveyor, Town Hall, Felixstowe.

London, N., January 24—Castings, lamp columns, etc., for the Southgate Borough Council. Mr. J. T. W. Peat, borough engineer and surveyor, Southgate Town Hall, Palmers Green, London, N.13.

London, W., February 3—Ironwork for sewers, etc., for the St. Marylebone Borough Council. The Town Clerk, Room 33, Town Hall, St. Marylebone, London, W.1.

London, W., February 4—Iron goods, heavy iron and mild steel, etc., for the Kensington Borough Council. The Town Clerk's Office, Town Hall, Kensington, London, W.8.

Swansea, February 1—Gullies, frames, iron, steel, scrap metal, manhole covers and frames, etc., for the Borough Council. The Borough Engineer and Surveyor, Guildhall, Swansea.

B.T.-H. SCHOLARSHIP SCHEME

To commemorate the jubilee of the British Thomson-Houston Company, Limited, which was celebrated last year, the directors arranged for a number of financial grants to be awarded over three years to assist employees of at least 10 years' service, in the education or training of their children of school-leaving age or over. These awards will be made where the circumstances merit such additional assistance, and it is not intended that they should be confined to engineering training, as the B.T.-H. apprenticeship and fellowship schemes meet nearly all such requirements.

Of the total number of applications received, 28 per cent. were outside the scope of the scheme, 40 per cent. were deferred as no expenditure was involved during the present academic year, and 32 per cent. were considered for awards. In 20 per cent. of the cases, grants were made up to £100 each for 1946-47, and where expenditure is involved this year or next year the granting of awards will be continued.

THE DECEMBER BULLETIN of the Association of Bronze and Brass Founders contains details of a simple cost system for small foundries. Over half a page is devoted to specific cases where real personal help has been given to members. A letter from the Joint Committee on Metallurgical Education is printed. This asks for co-operation of the Association members in releasing personnel for day-time training. The details of the new agreement for the payment of wages to patternmakers are set out.

Holman Rotogrinds

Surface Type

Makes light work of fettling large castings, smoothing off welds, rails girders, etc., and finishing stone or concrete.

TOOLS TO FINISH THE JOB

Radial Type

The multi-purpose tool for grinding, polishing, cleaning, buffing, paint and scale-removal, etc. Compact, light and efficient.

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Raw Material Markets

IRON AND STEEL

Although the need for more pig-iron is clearly foreshadowed, if the output of light castings is to keep pace with the requirements of the building trade and of other industries, there is no immediate shortage. Supplies are carefully allocated and are reaching the foundries in sufficient volume to sustain the current scale of operations. There is, however, no surplus. Even the refined-iron makers are unable to accept any more export business at present, and pressure for hematite and low- and medium-phosphorus iron for special castings is increasing. As yet there is no perceptible improvement in the supply of native ironstone, but imports of foreign ore are maintained at a high level.

Embarrassments in the re-rolling industry due to the scarcity of billets are still acute. A few export orders for bars and sections are being executed by the use of discard steel and scrap, but the position is still difficult and would be even worse but for the distribution of supplies from Australia, which have made a timely arrival, with the promise of more to follow. Sheet mills are more favourably placed for bars and slabs, and are working with a steady rhythm.

Plate mills have about six months' work in hand and are handling a moderate amount of export orders, in addition to catering for swollen home requirements. In spite of this impressive congestion, regular deliveries to the shipyards, wagon and locomotive shops, and boilermakers, are maintained, and seldom is any complaint heard of industrial dislocation through lack of steel. Railway companies are clamouring for bigger tonnages of rails, sleepers and chairs, and now that the collieries are under a new *régime* a bigger demand for steel is anticipated from this source. Factory building is also imposing heavier demands on the output of the section mills.

NON-FERROUS METALS

Following their announcement of new selling prices of copper, lead and zinc on January 1, the Ministry of Supply have announced the withdrawal of the notification that holders of outstanding licences (for copper, lead and zinc metal as sold by the Directorate of Non-ferrous Metals) granted on or before December 31, 1946, would only be covered at the new prices. After discussions with the British Non-ferrous Metals Federation, the Ministry are now prepared to consider covering these outstanding licences at the prices ruling on December 31. Holders of such licences (including those who have, since January 1, converted their licences into contracts at the new prices) should apply to the Directorate of Non-ferrous Metals, 20, Albert Street, Rugby, not later than January 21.

The Ministry's latest announcement has been welcomed, as it is felt that to spring this change of procedure on consumers without warning, and at a particularly difficult time, was most unfair.

Supplies of both lead and zinc are still stringent. It is believed that many lead consumers are seeking to find substitutes owing to the prevailing supply position. Smelting capacity continues to hold up zinc deliveries. There has been some improvement, but shortage of coal is a major handicap.

NEW TRADE MARKS

The following applications to register trade marks appear in the "Trade Marks Journal":—

"TURNIGHT"—Metals and alloys, machine tools, etc. TURNIGHT (LONDON), LIMITED, 121, Kingsway, London, W.C.2.

"MACKDRAW"—Textile machinery. JAMES MACKIE & SONS, LIMITED, Albert Foundry, Springfield Road, Belfast.

"LONDEX"—Electric welding machines, elevators, etc. LONDEX, LIMITED, Brettenham House, Strand, London, W.C.2.

"SPEEDESI"—Powder dusting and liquid spraying machinery. E. ALLMAN & COMPANY, LIMITED, 115, The Hornet, Chichester.

"TRIBORD"—Wash boilers, fires and radiators, etc. HOGAN & WARDROP, LIMITED, City House, 158, City Road, London, E.C.1.

"JEKETO"—Grinding and pulverising machines. ALFRED CLAUDE LA RIVIERE, 21A, Brownlow Mews, Guildford Street, London, W.C.1.

"PNEUMAFIL"—Spinning and weaving machinery, etc. CARRIER ENGINEERING COMPANY, LIMITED, Carrier House, Catherine Place, London, S.W.1.

"MIDGELYTE"—Electric generators and motors, etc. ARTHUR LYON & COMPANY (ENGINEERS), LIMITED, Africa House, Kingsway, London, W.C.2.

"SURMAS"—Electric cooking stoves, etc. TECO SOCIETE ANONYME, c/o Trade Mark Protection Society, 50, Lincoln's Inn Fields, London, W.C.2.

"HTB LTD" (CIRCULAR DEVICE)—Paper feeding machines. H. T. B., LIMITED, Paragon Works, Blackhorse Lane, Walthamstow, London, E.17.

"BOFEC"—Machinery for prospecting and drilling petroleum, etc. BRITISH OILFIELD EQUIPMENT COMPANY, LIMITED, 28, Victoria Street, London, S.W.1.

"CLECO"—Electric control apparatus; arc-welding apparatus, transformers, etc. CLECO ELECTRIC INDUSTRIES, LIMITED, 7, Freeschool Lane, Leicester.

"ISOTROL"—Mercury-arc rectifiers, electric control apparatus, etc. LANCASHIRE DYNAMO & CRYPTO, LIMITED, Trafford Road, Trafford Park, Manchester, 17.

"LEONARD SALOSTAT"—Water supply installations, etc. WALKER CROSWELLER & COMPANY, LIMITED, Whaddon Works, Clyde Crescent, Cheltenham.

THE LONDON AND DISTRICT IRONFOUNDERS' ASSOCIATION announce that their name has been changed to the South of England Ironfounders' Association.